DELIQUESCENCE, GROWTH AND RECRYSTALLIZATION CHARACTERISTICS OF MICROSTURCTURED AESROSOLS

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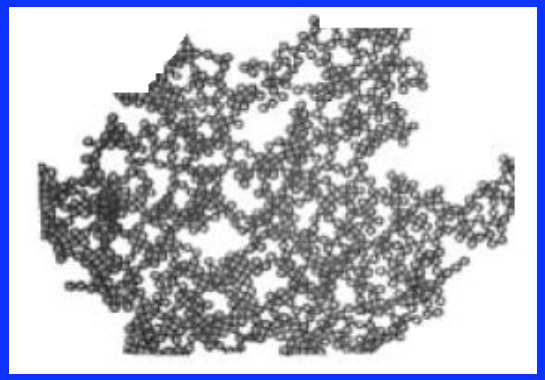
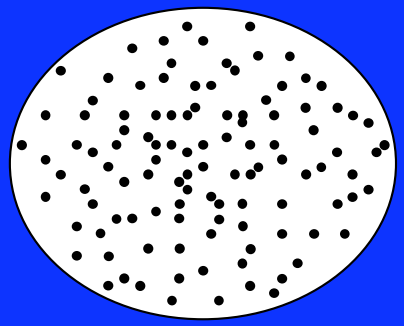
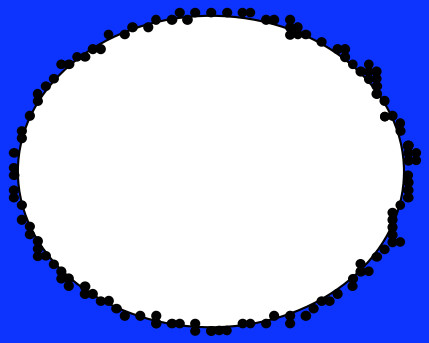
VARIOUS FORMS OF MICROSTRUCTURED AEROSOLS



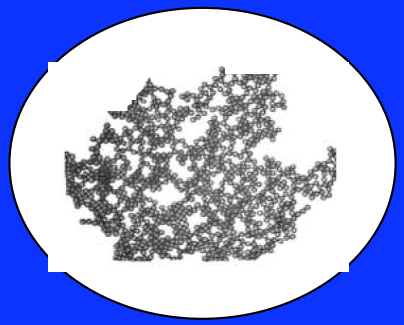
(i)



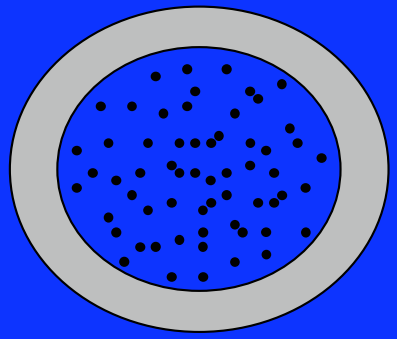
(ii)



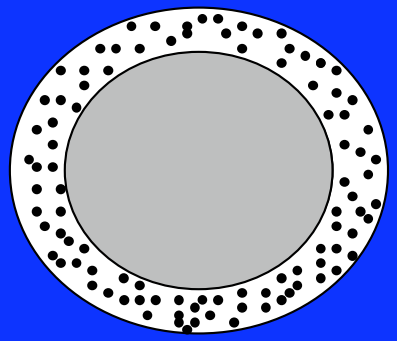
(iii)



(iv)



(v)

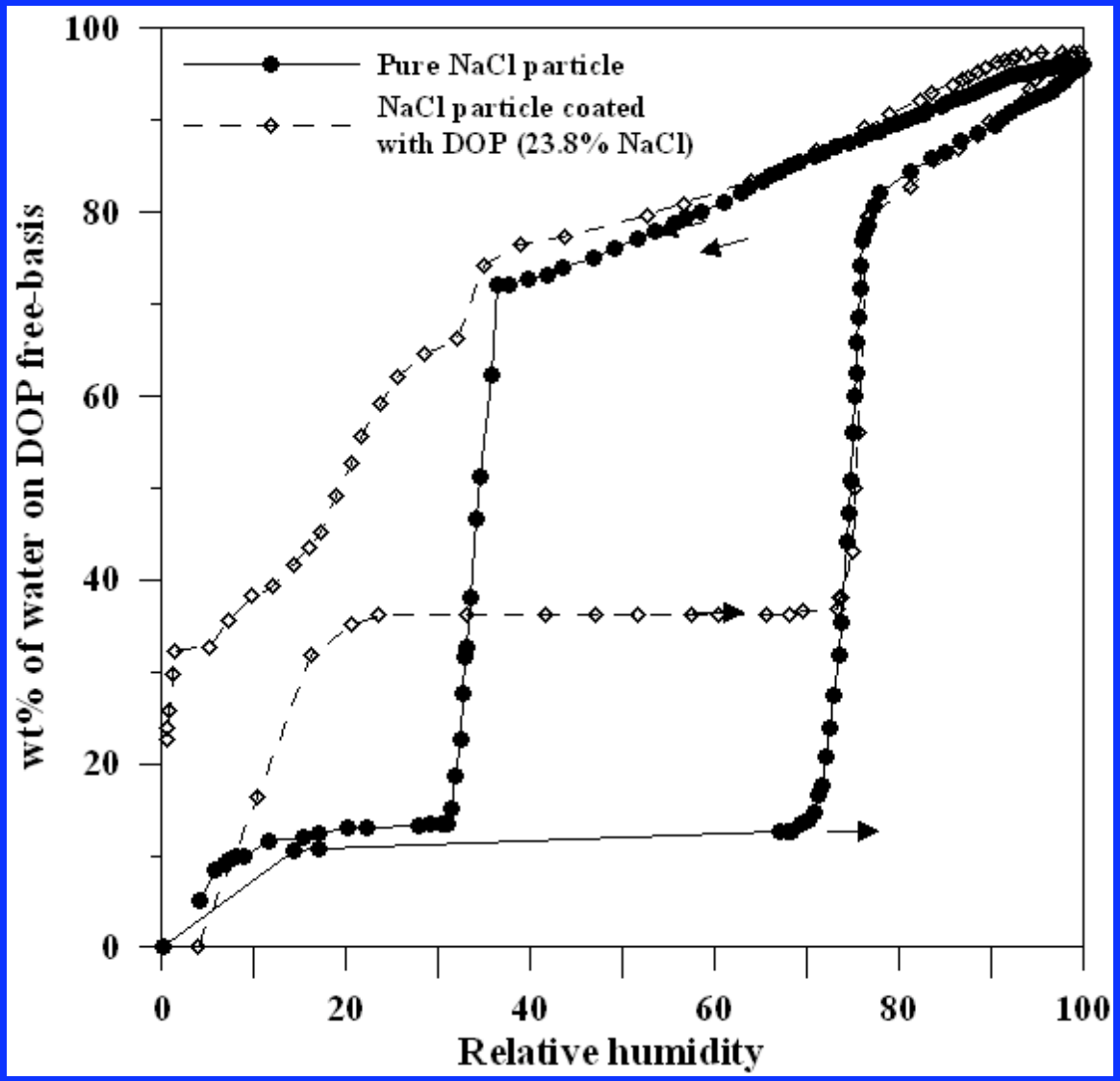


(vi)

OUTLINE

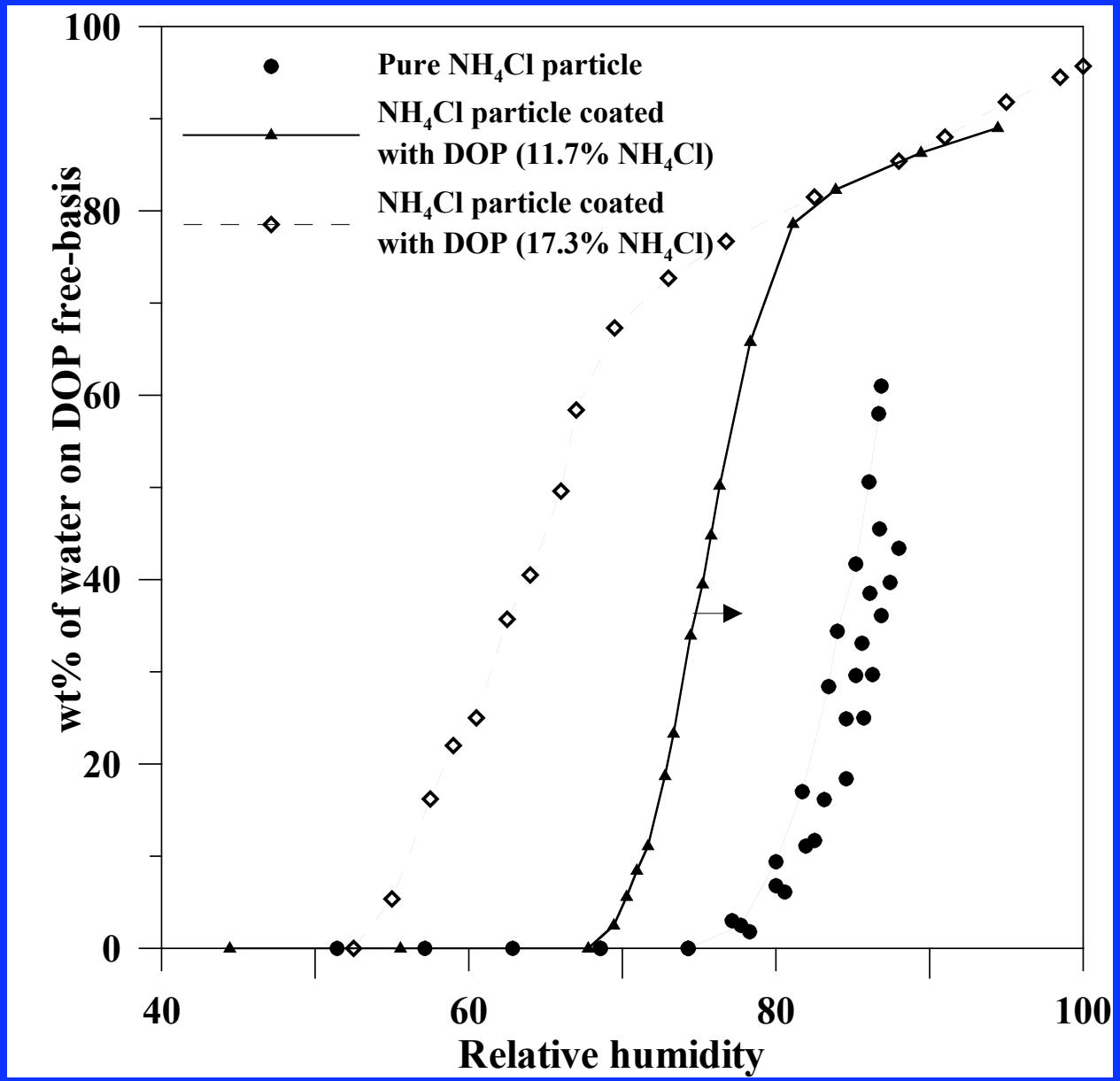
- Investigated hygroscopic properties of micro-structured aerosols containing black carbon (BC), hydrophilic compounds (e.g., inorganic salts) and hydrophobic organics (e.g., DOP).

- Experiments were conducted on single droplets that were suspended in an electrodynamic balance. Response to varying humidity was measured using graviometric and light scattering techniques.



Water content versus relative humidity data from pure NaCl particles are compared with those from NaCl particles coated with DOP.

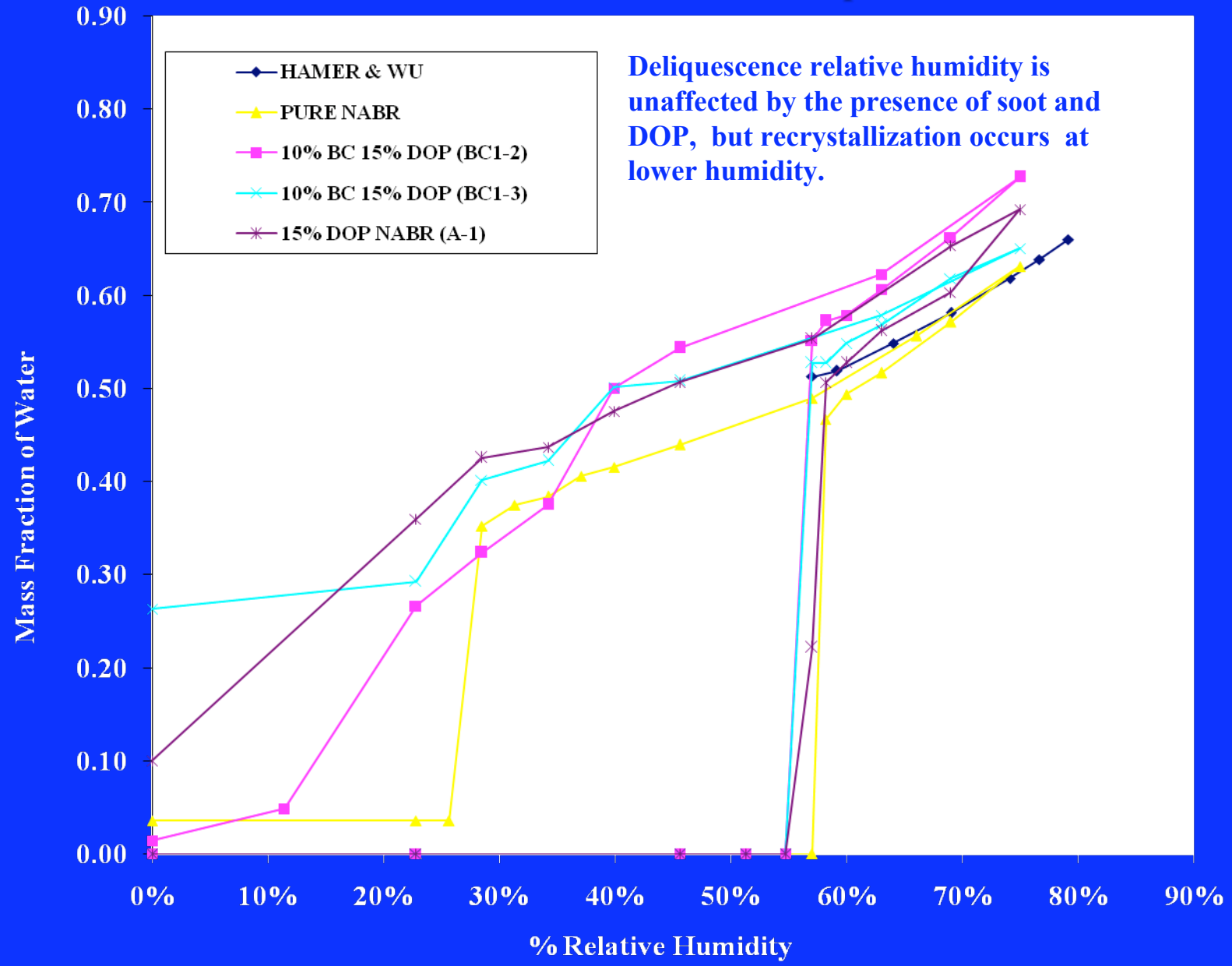
Thermodynamic analysis shows that presence of hydrophobic layer on a salt particle lowers it deliquescence point.



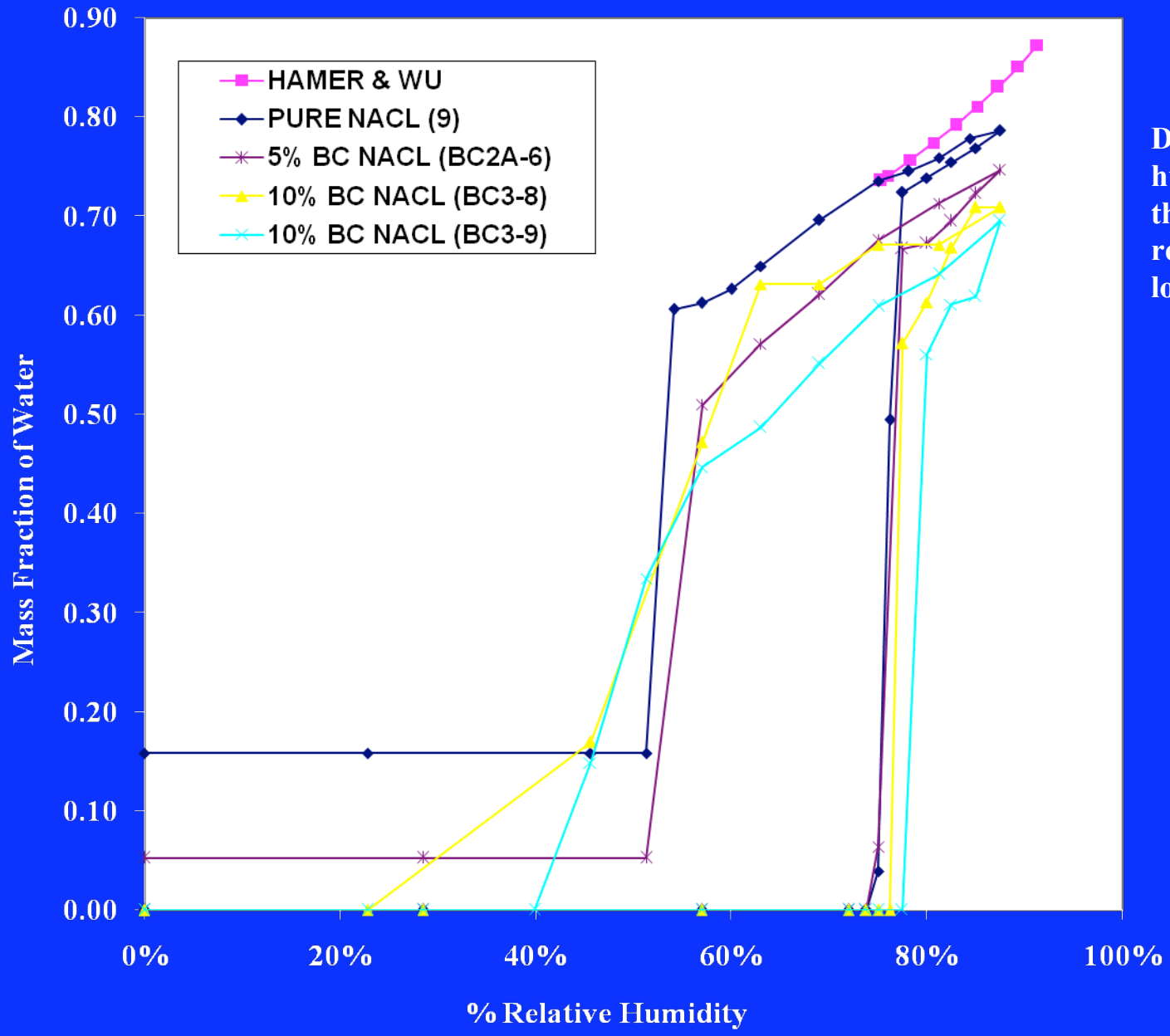
DOP layers on NH_4Cl particles lowers deliquescence point relative humidity.

Water content versus relative humidity data from pure NH_4Cl particles are compared with those from NH_4Cl particles coated with DOP.

Effect of BC & DOP on Water Absorption of NaBr



Effect of BC on Water Absorption of NaCl



Deliquescence relative humidity is unaffected by the presence of soot , but recrystallization occurs at lower humidity

CONCLUSIONS

- The presence of hydrophobic layers on salt particles lowers the deliquescence point relative humidity. The lowering depends on the wt% of salt initially present. Beyond the deliquescence point of pure salt, water content is unaffected by the presence of hydrophobic layer.

- For soot particles coated with inorganic salts and hydrophobic organic layers that deliquescence humidity is unaffected, but recrystallization occurs at a lower humidity.

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DOE National Institute for Climatic Change Research